

Verde Road, Adobe Road, Aztec Road, Hope Road, Bacobi Road (County Route 277), and Bosque Road presently connect the project property to US Highway 68. All of these roadways are section line arterials except Hope Road and Amado Road, which are mid-section line major collector roadways. Per the available Assessors Maps, all of the north-south access roadways presently have either 80 to 100 foot rights of way dedicated, or 40 to 50 foot half street rights of way dedicated. All of the preceding roadways have at grade drainage crossings which render the roadways impassable during storm (flood) events. All weather (paved road) access to the project site is also provided via Shinarump Road between Interstate Highway 40 and Aztec Road. Shinarump Road is a two lane facility which is unpaved west of Aztec Road. Shinarump Road is also designated Mohave County Route 223. See Figure 6-3 for typical access roadway.



Figure 6-2 Old Oatman Highway (US 66) Northeast of the Project



Figure 6-3 Paved Project Access Road

Planned Improvements – Government

Review of the Mohave County, Arizona Department of Transportation, (ADOT), and the WACOG websites revealed no planned projects for roadway improvements which would impact this project.

ADOT has a budget for Fiscal Year 2005 to repair scour on the Interstate Highway 40 bridge over the Holy Moses Wash.

Trip Generation and Project Impacts

The keys to the success of this project are either providing access to nearby US Highway 68 and Interstate Highway 40, or internal capture of the project generated traffic. This project will develop just under nine sections of land, of which approximately six sections will be developed as residential uses. For single family detached dwelling units, peak hour trips occur between 7:00 and 9:00 am and 4:00 and 6:00 pm, corresponding to commercial and industrial peak hour trips. A single section of land developed at a density of four units per acre, will generate about 20,536 trips per day, with 1,351 outbound and 450 inbound am peak hour trips and 1,250 inbound and 734 outbound pm peak hour trips. At this rate, it is clear that development of a

single section of land will overwhelm any individual access road intersection. Fortunately, this project can be accessed using eight roadways (six on the north, and two to the east), spreading the demand out and greatly reducing the impact of the development. This only moves the choke points further away, to State Route 68, the intersection of Shinarump Road at Old Oatman Highway, and the Shinarump interchange on Interstate Highway 40. Due to the high volumes of trips generated by the development it is suggested that the roadways providing access from the development to US Highway 68, Old Oatman Highway and Interstate Highway 40 be improved as follows. The section line roadways such as Verde Road, Aztec Road, Shinarump Road, Aquarius Drive, Tombstone Trail and Bacobi Road needs to be six lane facilities, and the mid section line major collectors need to be four lane facilities.

The latest Average Annual Daily Trip (AADT) volumes available through ADOT are for the 2002 year. At that time, Interstate Highway 40 was carrying 14,202 trips between the Ford Proving Ground Exit and the Shinarump Exit, and 11,783 trips between the Shinarump Exit and the Beal Street Exit. The traffic difference is the traffic utilizing the Shinarump Exit (about 242 peak hour trips). There is significant capacity on both the Interstate Highway 40 (about 7,000 bi-directional peak hour trips) and the Shinarump interchange for project generated traffic (about 800 bi-directional peak hour trips).

Between Verde Road and US Highway 93, Arizona Route 68 carries 11,500 ADT, leaving capacity of about 2,000 (bi-directional) peak hour trips, assuming single digit increase percentages in the last two years.

Internal capture will be required to be discussed further. Without internal capture, the impacts of this project will be significant. As stated above, the Shinarump Interchange will be overwhelmed in short order, which can be mitigated by additional ramp lanes and traffic signals at each interchange intersection. At this point, there is no traffic turning movement count data available on any of the roadways directly serving the project area. Therefore, intersection capacity and level of service analysis has not been conducted.

Circulation Elements

While it would ease traffic flow considerations greatly to follow the existing grid system of roadways in place, it is also reasonable to enclose the project to make it more desirable and attractive. Initial review of the RNM plan shows four intersections with roadways on the existing grid roadway network. Intersections are planned on Shinarump (1), Aquarius (2), and Tombstone (1). In order to accommodate anticipated traffic under balanced demand, all roadways on the RNM plan should have 100-foot cross sections and should be widened to accommodate dedicated right and left turn lanes at intersections with other 100-foot right of way facilities. The network of internal collector and local roadways can then be developed as necessary to provide access to all trip generators and trip attractors within the project limits. The

intersections of all roadways with 100-foot or wider cross sections should be tapered (widened) to accommodate dual left turn lanes and dedicated right turn lanes as determined by traffic study analysis. The need for turn lanes will be determined by placement and density of land use types. In the event the developer decides to eliminate the Tombstone Trail entrance, those six lanes will need to be added to the other three project entrances.

In terms of trip attractors, existing facilities south of this development are not significant. Therefore, only drivers going between the development and Kingman will utilize either of the Aquarius entrances. This scenario applies to the project generated traffic using Shinarump Road. If internal capture is assumed to be 30%, and Kingman demand is also assumed to be 30%, the main project connection at Shinarump Road must accommodate 55% of the project generated traffic (balance of 40% plus half of the Kingman traffic which utilizes Shinarump Road). Under these assumptions and build-out conditions, Shinarump at Aztec will have to be a ten lane facility plus turn lanes, and Aztec Road becomes a six lane facility.

Development Scenarios

It is our understanding that this project will be initiated with construction of a golf course and model homes, followed by phased subdivision and commercial facility construction to parallel sales. The 18-hole golf course will generate 40 am peak hour trips and 50 pm peak hour trips, requiring approximately 2 miles of roadway construction to connect a new two lane roadway to the existing two lane roadway system. This will support the golf course and construction traffic. By the time phase I is fully constructed and occupied, the development will generate between 102,500 124,890 daily trips with between 9,800 and 12,100 am peak hour trips and 12,040 to 14,110 pm peak hour trips. Please refer to the Golden Valley South Area Plan exhibit section for the latest conceptual master plan. If this development is secured with only four connections to exterior roadways, each of these connection points will need to have sufficient capacity to accommodate 30% of the demand generated by the development under balanced demand conditions.

At intersecting major roadways, lane capacity is about 1,200 vehicles per hour per lane. If four intersections with supporting off-site roadways are planned, each of the intersecting roadways need to have enough right of way to accommodate six (through) lane facilities to support the project development at build out under uniform demand conditions. Dedicated turn lanes at each intersection should also be provided. See Figure 6-4 for turn lane recommendations. Additional connections to off-site roadways will reduce the demand at each other connection point, improve the level of service at which each intersection operates, and reduce the number and severity of traffic accidents at project entry points.

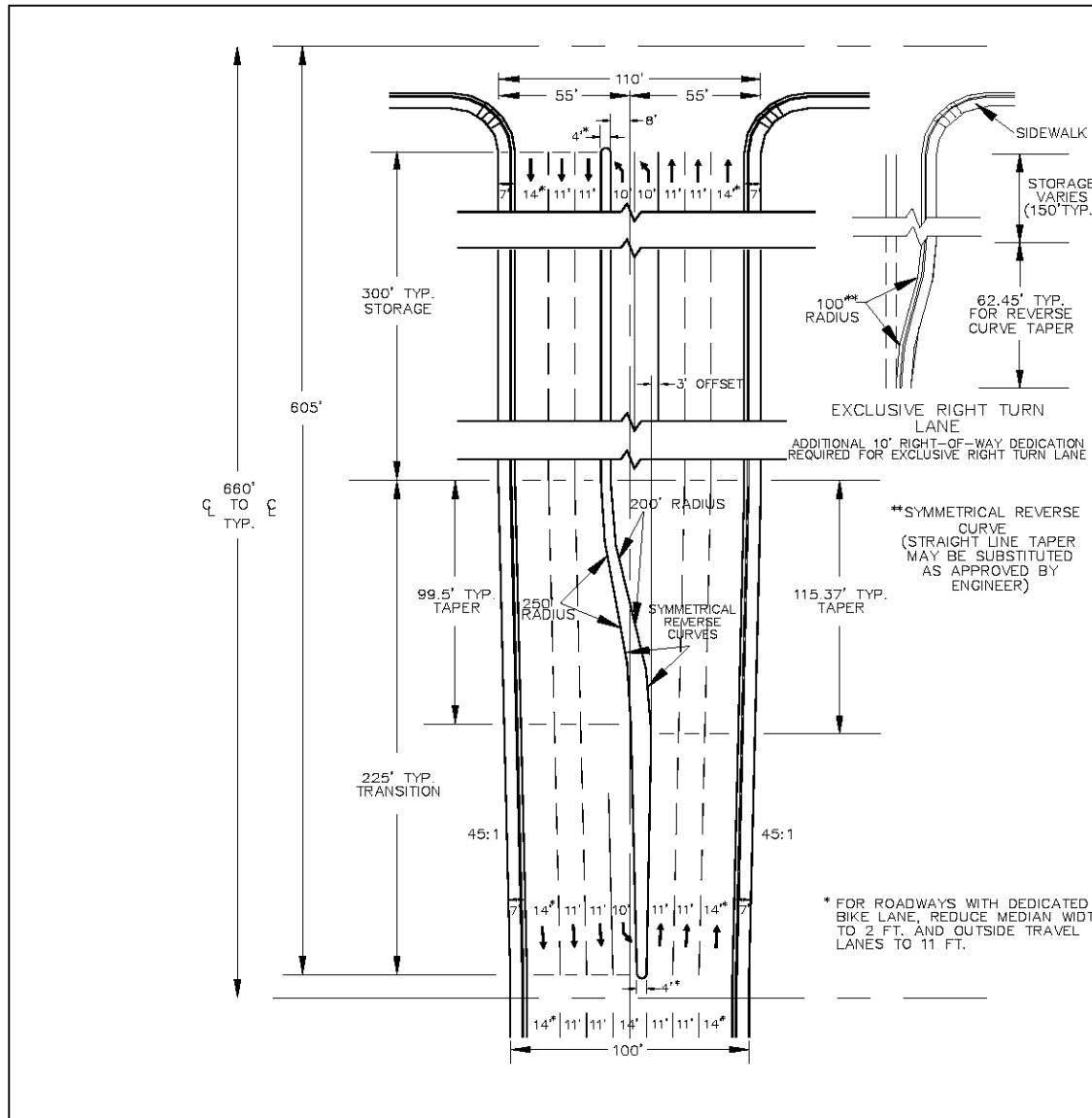


Figure 6-4 Typical Dedicated Turn Lane

Three Phase II development scenarios are under consideration by the Developer. Under Scenario 1, Phase II will be developed at the same density (4 residential units per acre) as Phase I, under Scenario 2, Phase II will be developed at 6 residential units per acre, under Scenario 3, 34,800 residential units will be developed in addition to the other project amenities. By the time Phase II Scenario 1 is complete, an additional 100,000 daily trips will be generated by this development, including 9,100 am peak hour trips and 9,200 pm peak hour trips assuming the same residential density as Phase I. Alternately, Phase II Scenario 2 will generate an additional 121,800 daily trips, including 11,100 am peak hour trips and 11,500 pm peak hour trips (over and above that generated by Phase I). If Scenario 3 is constructed, the project will generate an additional 162,000 daily trips, including 15,200 am peak hour trips and 15,100 pm

peak hour trips. While internal capture may account for significant portions of the project generated trips there is no way to control the number of people employed and living within the development versus people working inside the development and living elsewhere, and people living in the development and working outside the development.

Evaluation of regional traffic model components shows that the City of Kingman, and Bullhead/Laughlin are major trip attractors for this area. This makes capacity of Interstate Highway 40 interchanges, and US Highway 68 intersections critical, when these capacity issues are resolved; both of the mainline capacities become critical. Reference the discussion in the above paragraph titled Trip Generation and Project Impacts.

Because internal capture and directional splits between gravity model components can not be accurately predicted, it is recommended that off-site improvements be constructed in stages as they are needed. It is anticipated that internal capture could be as low as 10% and as high as 50%, with the expected realization of internal capture somewhere between these two extremes. Table 6-1 was developed based on a 30% - 70% split between Kingman – Bullhead/Laughlin respectively, and 30% - 70% Aquarius – Shinarump roads respectively. With this in mind, Table 6-1 presents the required number of roadway lanes (assuming moderate conflicting traffic) and intersection lanes given different internal capture scenarios.

Table 6-1- Roadway/Intersection through lane requirements.

Roadway/Internal Capture	20%	25%	30%	35%	40%	45%	50%
Aztec*	6/12	6/10	6/10	6/10	6/10	6/10	6/8
Shinarump*	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Aquarius*	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Aztec**	8/12	8/12	8/12	8/12	6/10	6/10	6/10
Shinarump**	4/4	2/4	2/4	2/4	2/4	2/4	2/4
Aquarius**	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Aztec+	8/14	8/12	8/12	8/12	6/12	6/12	6/10
Shinarump+	4/4	2/4	2/4	2/4	2/4	2/4	2/4
Aquarius+	2/2	2/2	2/2	2/2	2/2	2/2	2/2

* Represents 4 residential units per acre in Phase II.

** Represents 6 residential units per acre in Phase II.

+ Represents 43,800 Residential units plus amenities.

Estimated Costs

Table 6-2 below includes on-site improvements inside the general boundaries of the project discussed in Section 6.5 of this report. Assuming the RNM plan (or a fairly close facsimile) is adopted and constructed, at build-out, this project will have approximately 12 signalized arterial-arterial intersections at an estimated cost of \$2.4 million, about 14 miles of arterial and Parkway facilities at an estimated cost of \$14.7 million, and about 10.25 miles of off-site roadway improvements at a cost of \$10.25 million. Of course, the Land Use Plan which is finally adopted for this area will have significant impacts on the final configuration and cost of the traffic infrastructure. Capacity of the internal roadway network components will be determined by the location and density of trip attractors (work, commercial, recreation) relative to the trip generators (residential).

Table 6-2 -Estimated Costs in Thousands of Dollars.

Description	Unit	Quantity	Unit Cost	Total
PHASE I CONSTRUCTION				
Shinarump Road Connection (NS Pkwy)	Mile	3.5	\$1,200	\$4,200
Internal arterial roadways	Mile	4.5	\$1,000	\$4,500
Traffic Signal	Each	6	\$200	\$1,200
Aquarius Road improvement (to Oatman)	Mile	2.75	\$500	\$1,375
Phase I Total				\$11,275
PHASE II CONSTRUCTION				
Internal arterial roadways	Mile	6	\$1,000	\$6,000
Shinarump Road Improvements to Oatman	Mile	5	\$1,000	\$5,000
Traffic Signals at Arterial Intersections	Each	6	\$200	\$1,200
Participation in Off-site Signals	LS	1	\$100	\$100
Tombstone (Shinarump to Aquarius)	Mile	3	\$1,000	\$3,000
Shinarump & Aquarius extension to Tombstone	Mile	4.5	\$1,000	\$4,500
Phase II Total				\$19,800

Multimodal Considerations

In addition to the surface transportation systems proposed and existing, there exist, in the project vicinity, rail transport facilities for both freight and passengers. While Mohave County has an airport, it is located on the northeast side of Kingman. At this time, the Mohave County Airport Plan is undergoing revision. The Mohave County Airport (AKA Kingman Airport) has two active runways, 03/21 has a length of 6,831-feet and is 150-feet wide while 17/35 has a length of 6,724-feet and is 75-feet wide. It is a public, commercial airport owned by the City of Kingman. There are freight and

passenger facilities in operation at this time. Please reference AOPA's Airports USA and <http://www.ctaz.com/~kng2005/layout.htm>. While neither runway is sufficient for principal transport commercial or passenger (Boeing, McDonnell-Douglas, Lockheed) aircraft, both are adequate for most general aviation and short-haul (Beech, Cessna, Piper, Lear, carrying up to 50 passengers) aircraft. The airport is presently being used to store several principal transport aircraft including L10-11 and DC-8 bearing a variety of tail markings. This clearly indicates that the runways are capable of handling principal transport aircraft with some runway and taxiway extension projects.

The Burlington Northern & Santa Fe Railroad exists east of the project site between Interstate Highway 40 and the Hualapai Mountains. Parallel lines and yards exist near the Shinarump Road Interchange to serve the (closed) Northstar Steel Mill, located on the north side of the Shinarump Road Interchange, on the east side of Interstate Highway 40. A Spur crossing Interstate Highway 40 also exists north of the Shinarump Road Interchange. This railroad line connects Kingman Arizona with Los Angeles, California, Chicago Illinois, Minneapolis/St. Paul, Minnesota, and Houston, Texas. The rail is suitable for both freight and passenger travel. As shown in the 11x17 pull out route maps at the end of this chapter, access is available to four major shipping ports, as well as vacation destinations on three national borders.